Planning for North Carolina's Future:
Ask the Climate Question

Climate Change Adaptation Policy & Practice

Maryland Case-Study

Photo: Jane Thomas, UMCES

Zoë Johnson, Office for a Sustainable Future

Climate Resilience: Mitigation + Adaptation

Mitigation

Reducing greenhouse gas emissions in order to slow or stop global climate change.

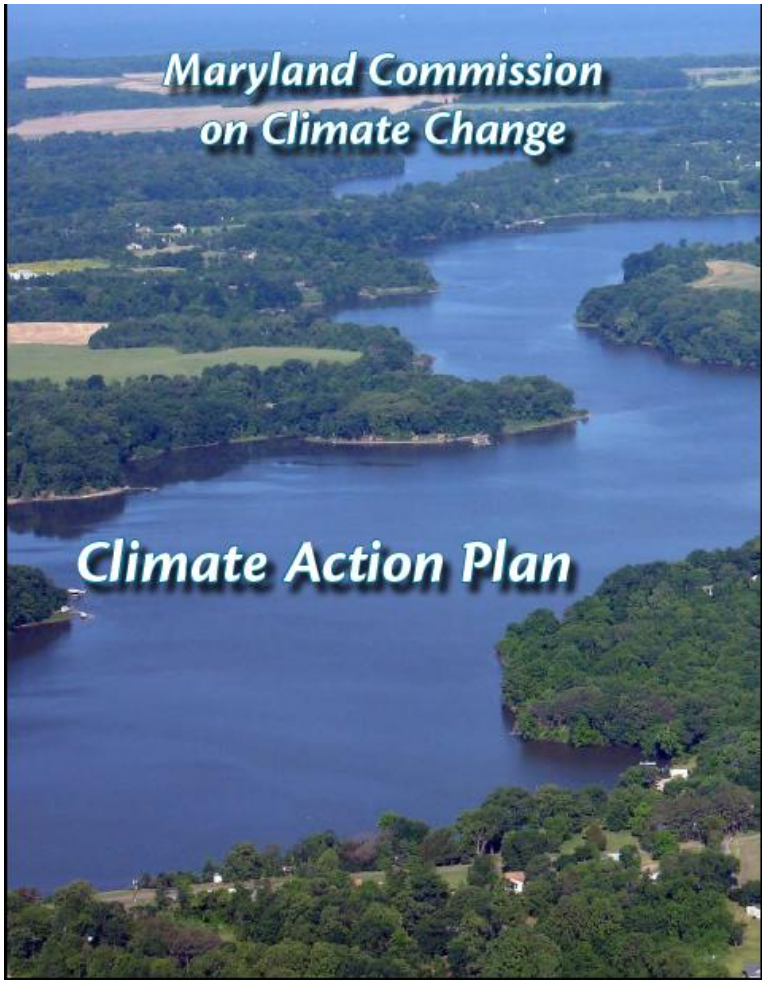
Adaptation

Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.

UKCIP (2008)

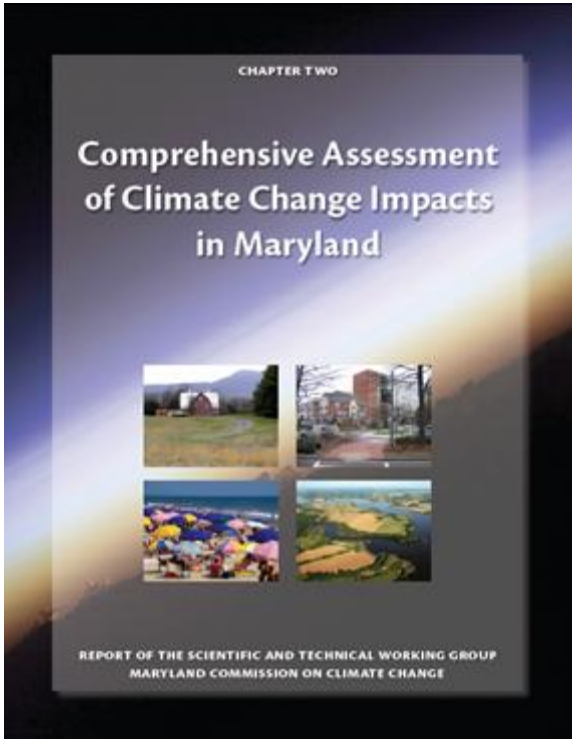
Maryland Climate Action

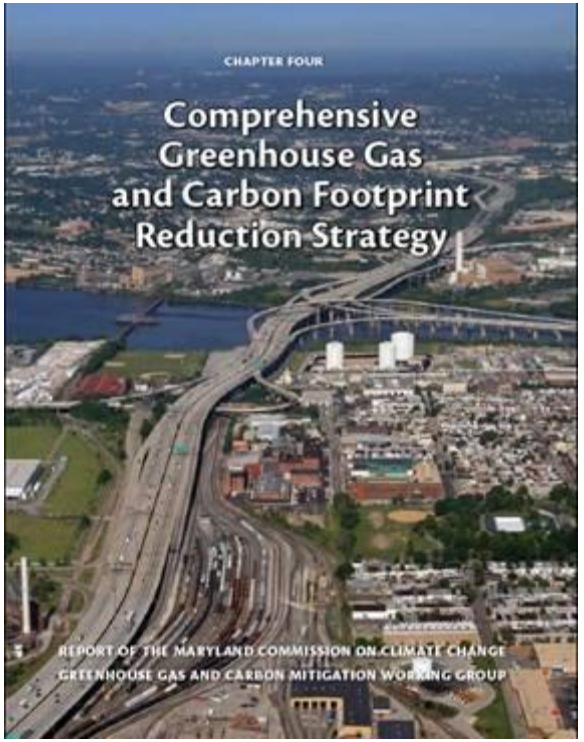
- Maryland Healthy Air Act (2006)
- Maryland Clean Cars Act (2007)
- EmPOWER Maryland (2008)
- NE Regional Greenhouse Gas Initiative (2007)
- Maryland Commission on Climate Change (2007)
- Maryland Climate Action Plan (2008)
- Greenhouse Gas Reduction Act (2009)
- Smart, Green & Growing Legislative Package (2009)
- Sustainable Forestry Act (2009)
- No Net Loss – Forest Conservation Act (2009)

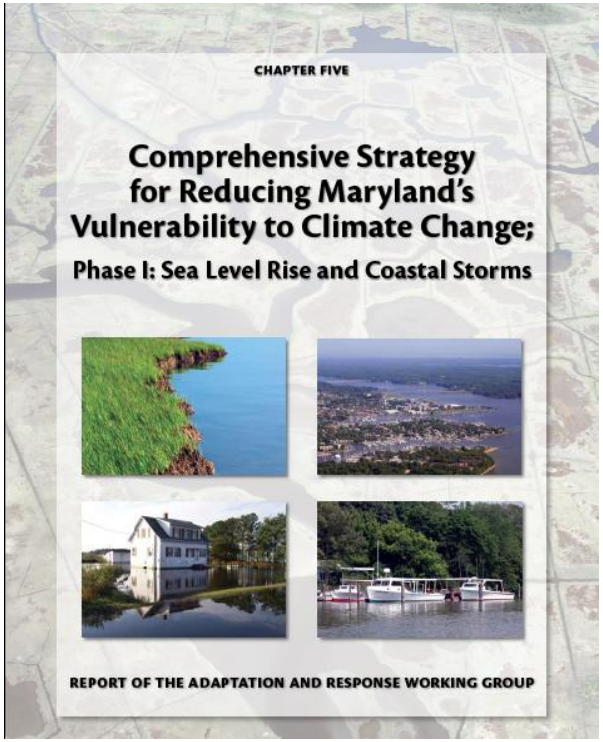


Maryland Climate Action Plan

August 2008







Sector-Based Adaptation

Affected Sectors	Climate Stressor	Climate Vulnerability	Adaptation Strategies
Water Resources	• Changes in precip. • Extreme events	• Decreased water supply • Increased flooding	• Create water markets • Improve flood control
Bay/Aquatic Ecosystems	• Sea level rise • Increased water temp	• Increased salinity • Habitat loss	• Install "living shorelines" • Protect critical habitat
Human Health	• Increased air temp. • Extreme events	• Vector-borne illness • Heat-related health effects	• Designate "cooling centers" • Vector-borne surveillance
Agriculture	• Changes in precip. • Sea level rise	• Drought • Salt-water intrusion	• Plant salt tolerant crops • Drought management
Forest/Terrestrial Ecosystems	• Changes in precip. • Increased air temp.	• Disease, Fire • Species shifts	• Fire mgmt. and control • Invasive species mgmt
Growth & Infrastructure	• Changes in precip. • Sea level rise	• Increased population growth • Increased flooding	• "Smart" site and building design • Retrofit storm water mgmt.
Coastal Zone	• Sea level rise • Extreme events	• Submergence of low-lying lands • Increased coastal flooding	• Protect coastal infrastructure • Increase natural vegetative buffers

Scientific Assessment (complete)

Adaptation: Phase I (complete)

Adaptation: Phase II (underway)

Adaptation Planning Process

Review state of the science

Assess climate vulnerability

Identify critical information gaps

Consider and prioritize key issues of concern

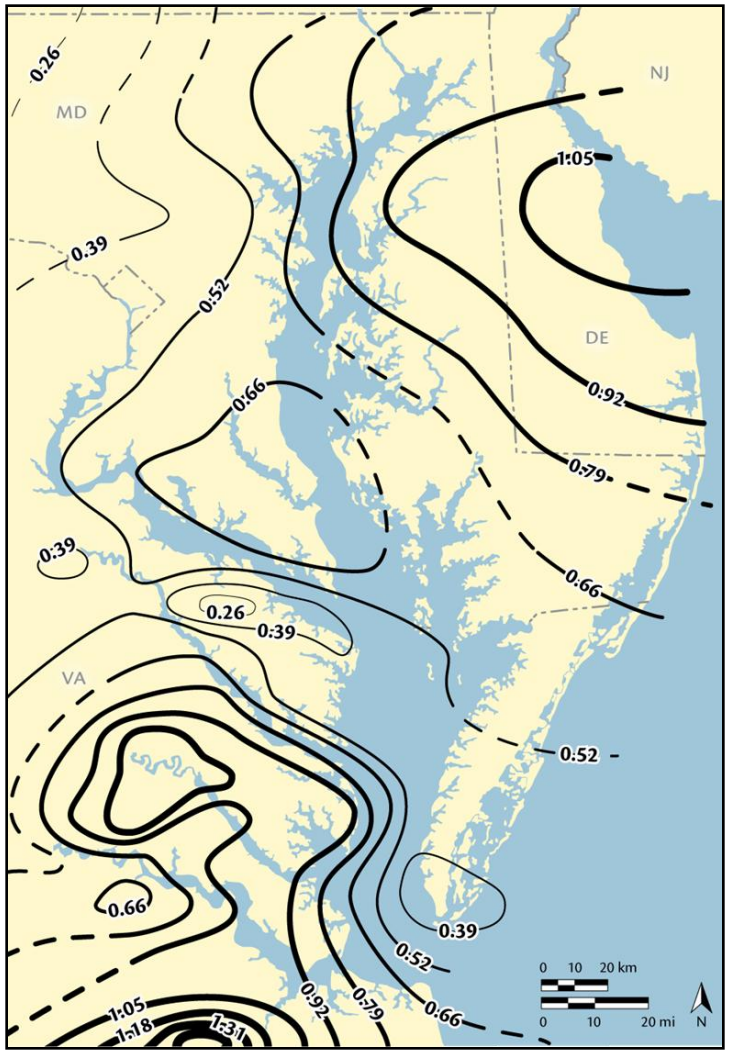
Explore potential adaptation strategies

Evaluate adaptation infrastructure (institutional framework)

Identify opportunities & mechanisms to affect change

Recommend action strategies (short, medium long-term)

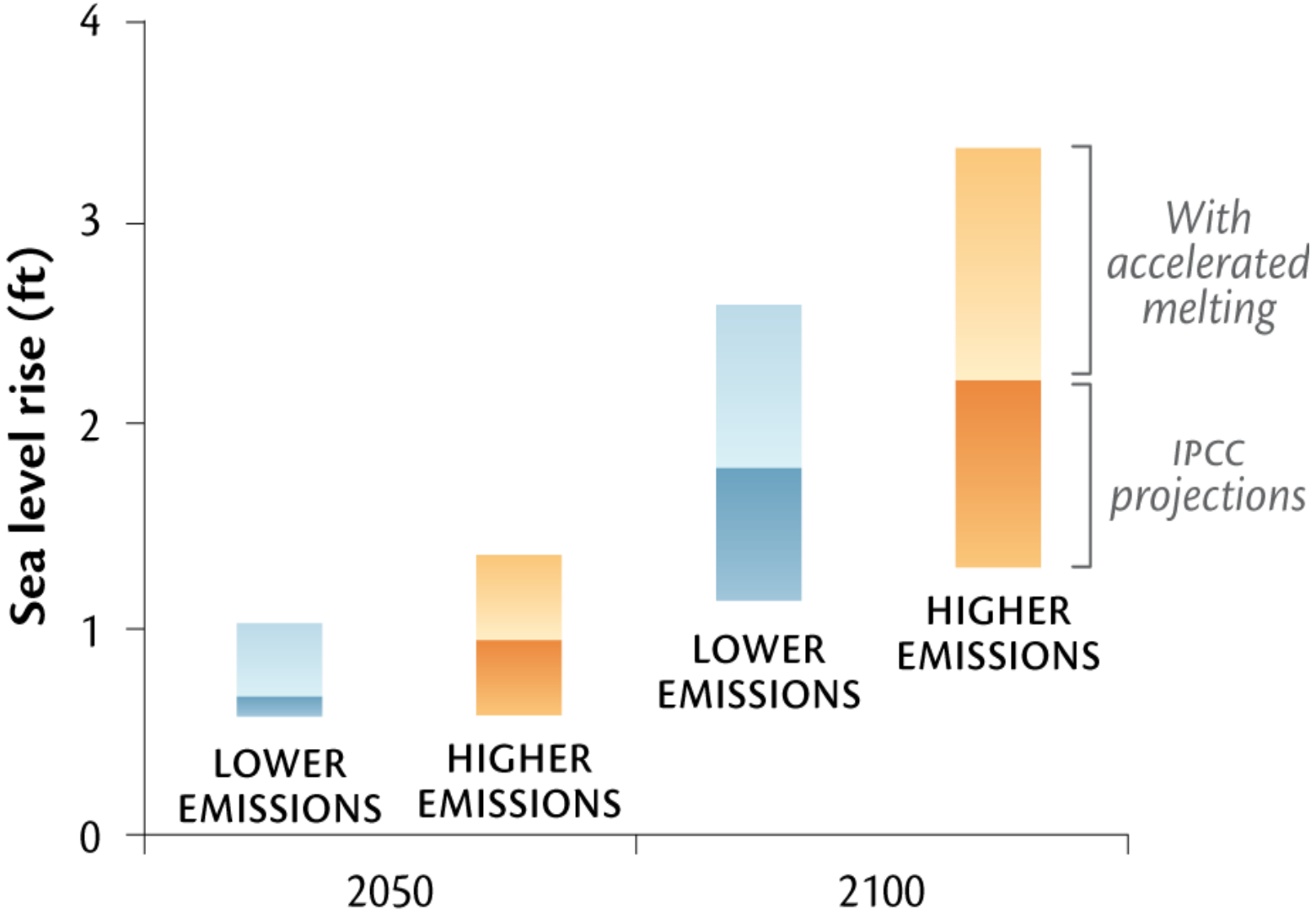
Relative Sea Level Rise – Historic



Regional Land Subsidence

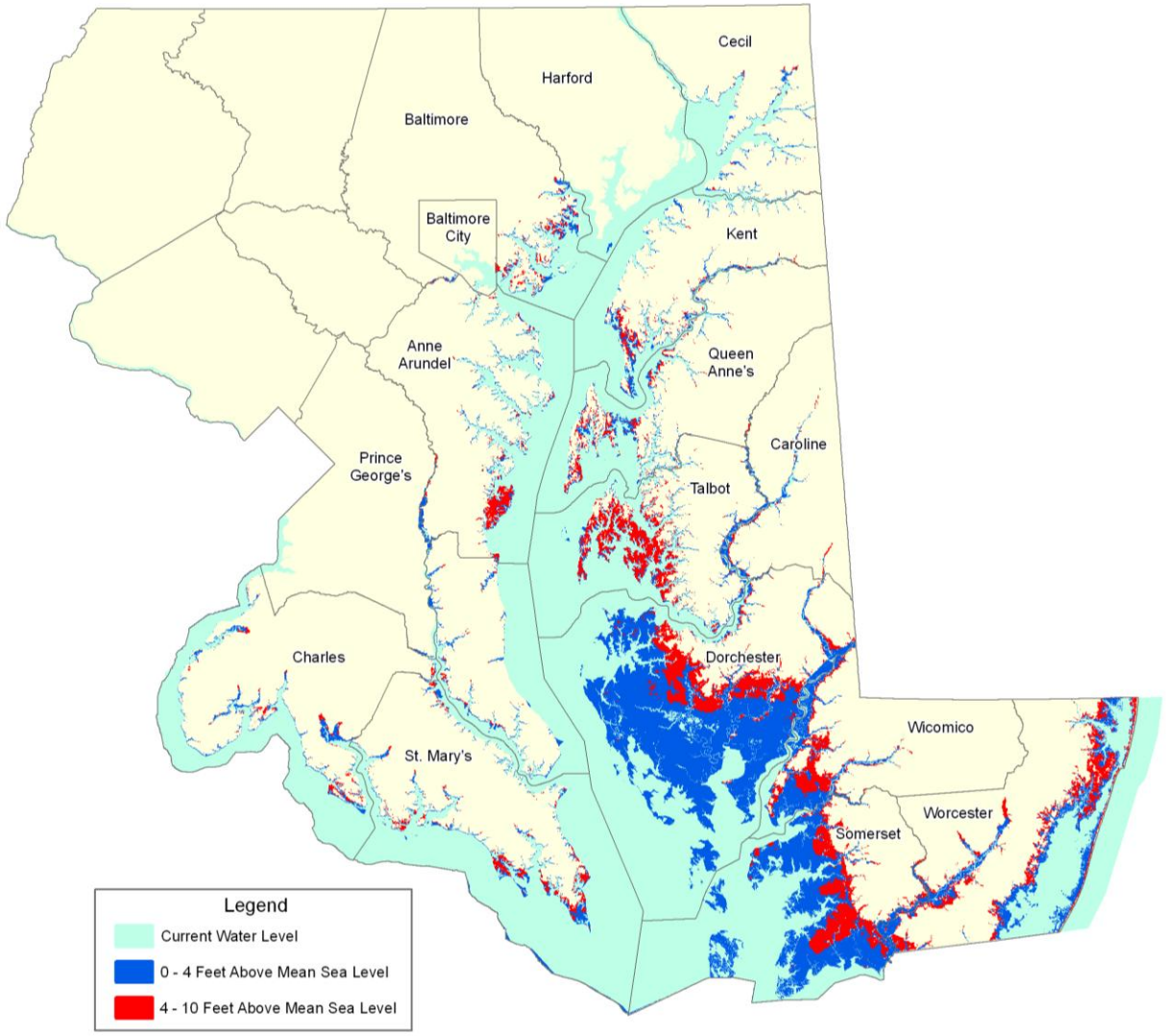
Measured Sea Level Rise (ft/century)

Future Risk to Sea Level Rise

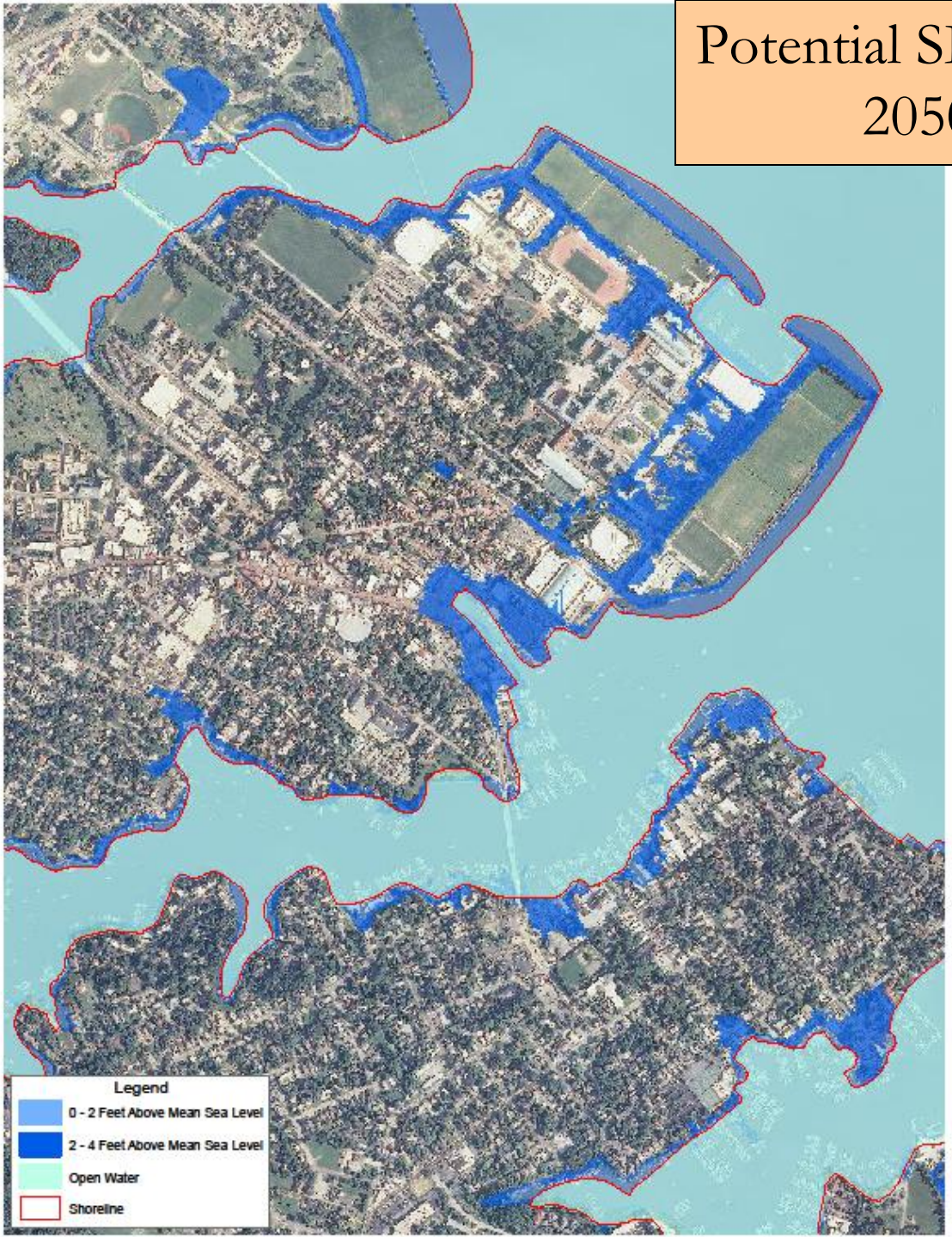


Maryland Climate Action Plan (2008)

MD's Vulnerability: Inundation and Increased Storm Surge



Potential SLR Inundation: 2050 - 2100



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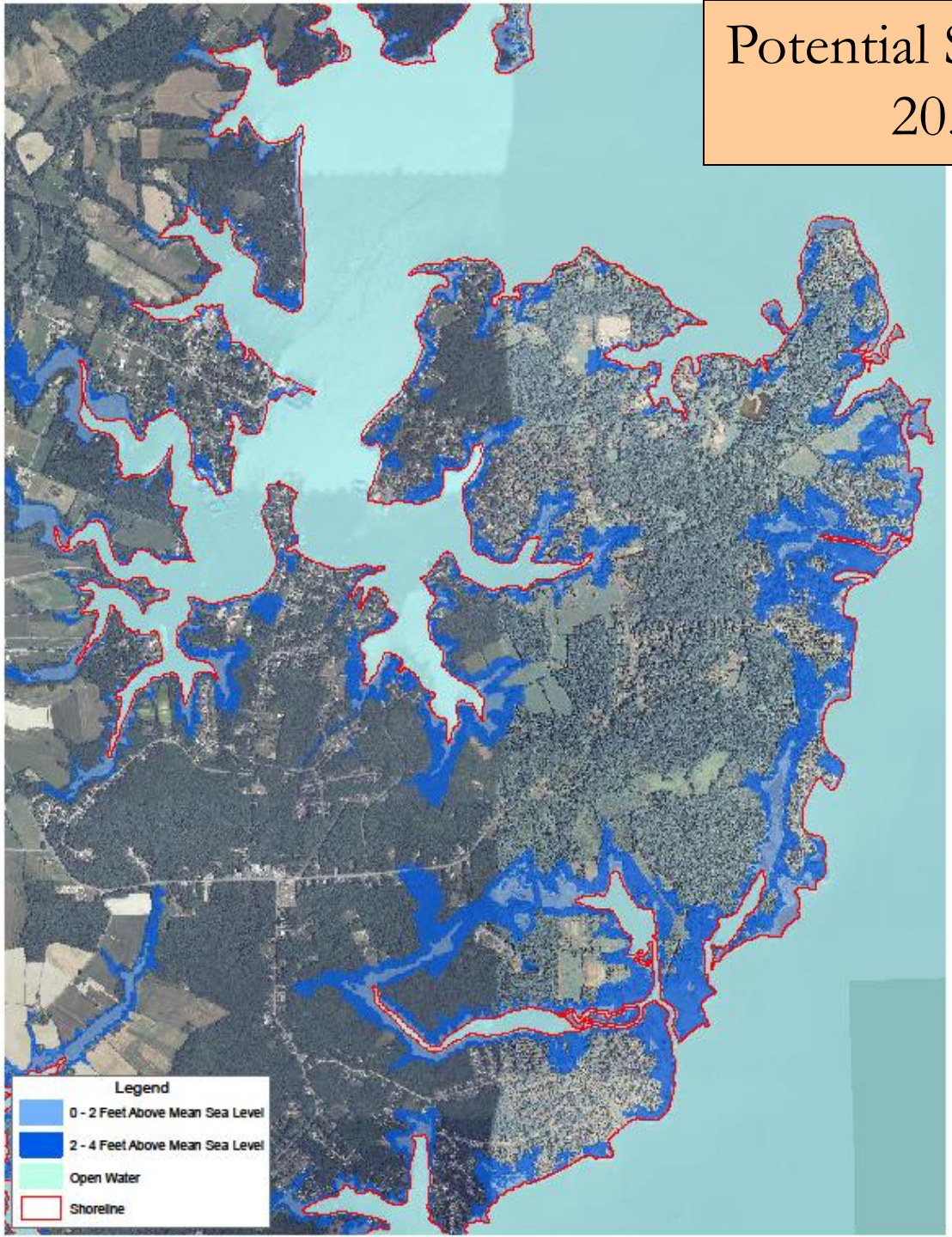

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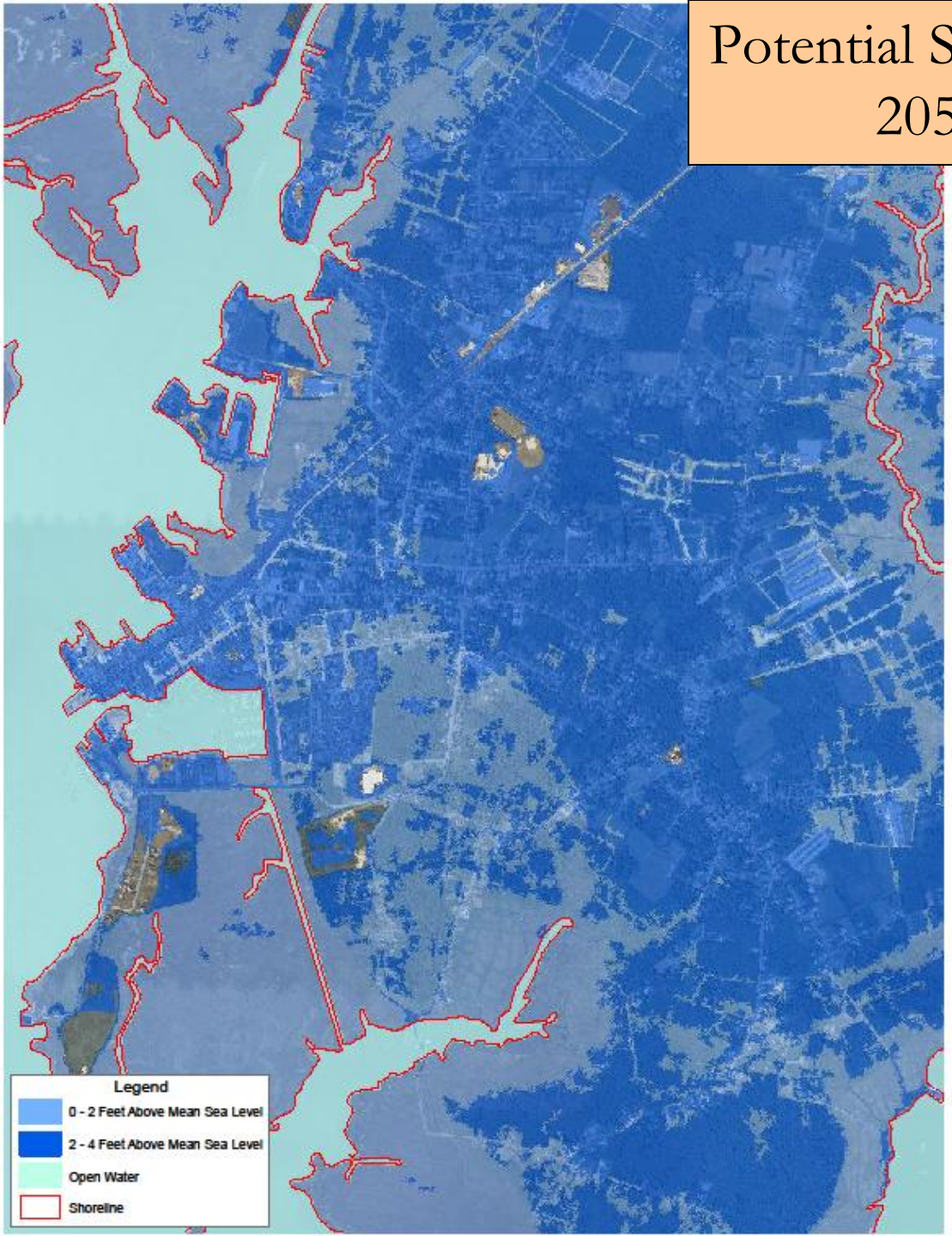


MD's Vulnerability: Erosion & Land Loss

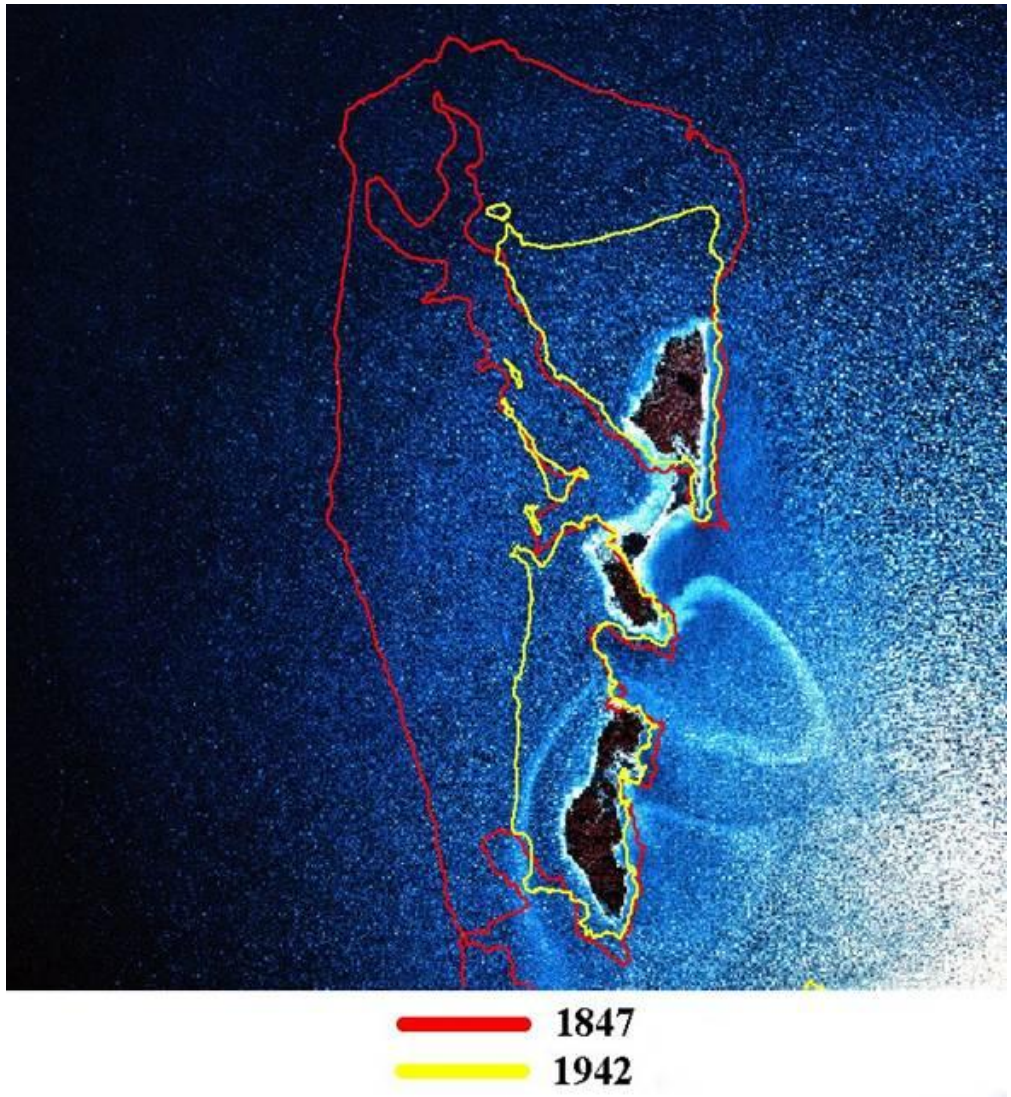
James Island

1847: 976 acres

1994: 92 acres

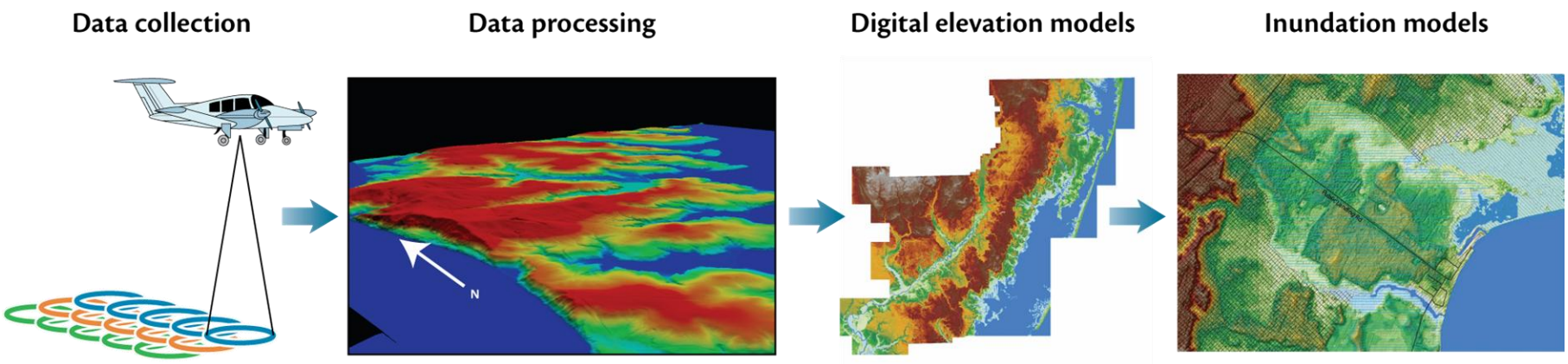
884 acres lost

6.0 acres/year



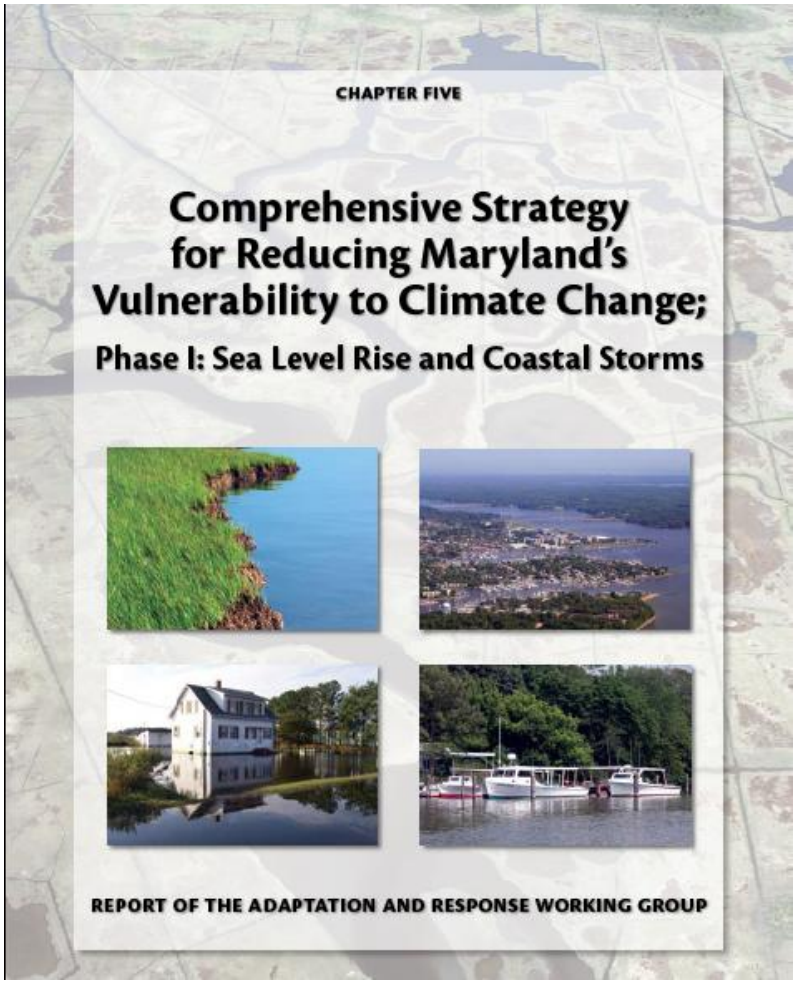
Adaptation Toolbox

- High Resolution Topographic Mapping (LIDAR)
- Economic Cost of Sea Level Rise Study
- Shoreline Erosion and Change Mapping
- Comprehensive Shoreline Inventory
- Maryland Shorelines Online
- USACE Chesapeake Bay Shore Erosion Study
- Sea Level Rise Modeling: Worcester & Dorchester
- State-wide Sea Level Rise Vulnerability Mapping
- Living Shoreline Suitability Tools
- Sea Level Rise Visualizations

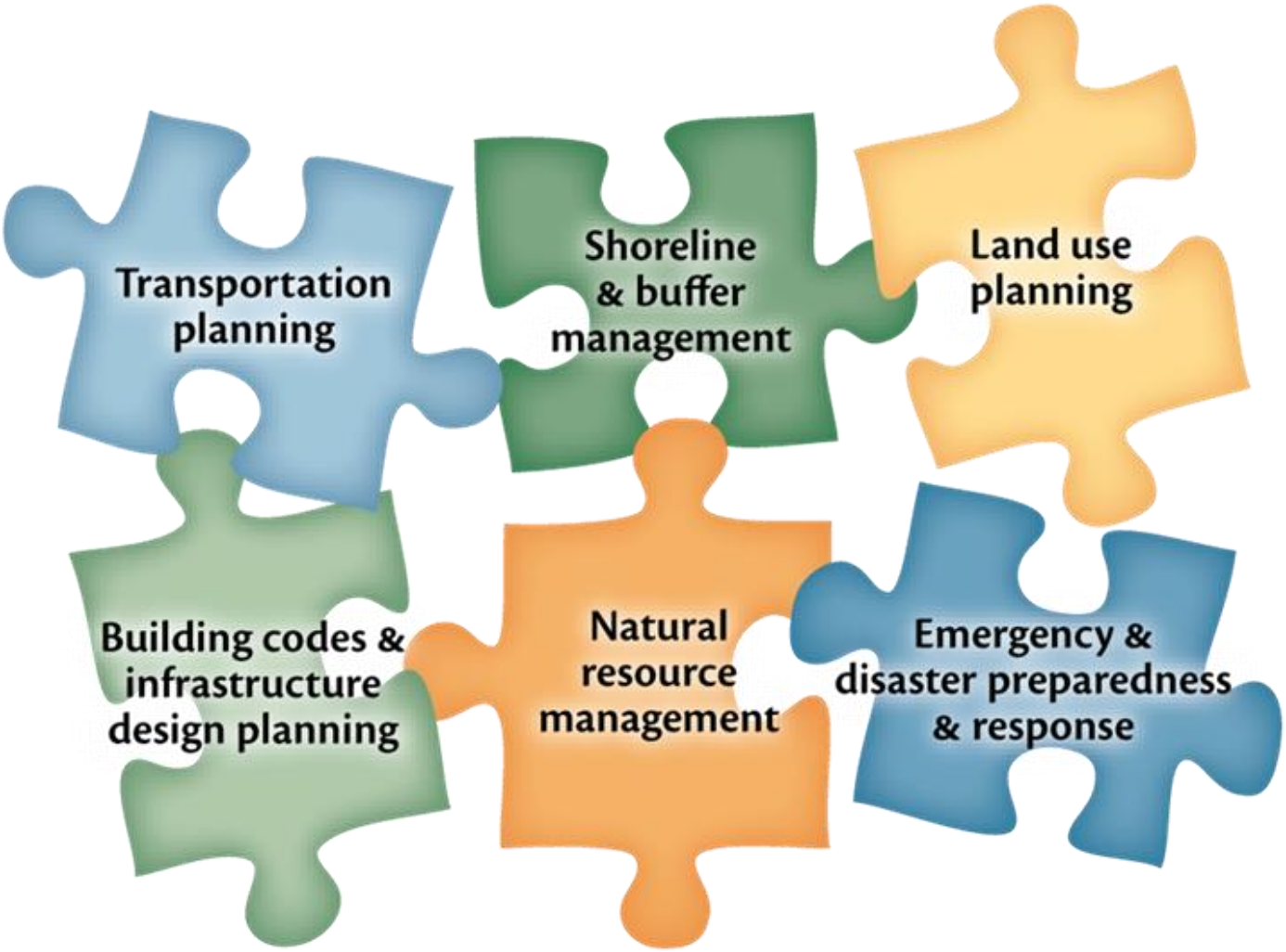


Adaptation Strategy Development

- Sea Level Rise Response Strategy (2000)
- Shore Erosion Task Force Final Report (2000)
- MD CZMA §309 Strategy (2000 & 2006)
- Coastal Communities Initiative (2004)
- Comprehensive Strategy to Reduce Maryland's Vulnerability to Climate Change: Phase I (2008)



Climate Change Adaptation: An Integrated Approach



Vision for the Future:
Protect Maryland's People, Property, Natural Resources, and Public Investments

Promote programs and policies aimed at the avoidance and/or reduction of impact to the existing-built environment, as well as to future growth and development in vulnerable coastal areas

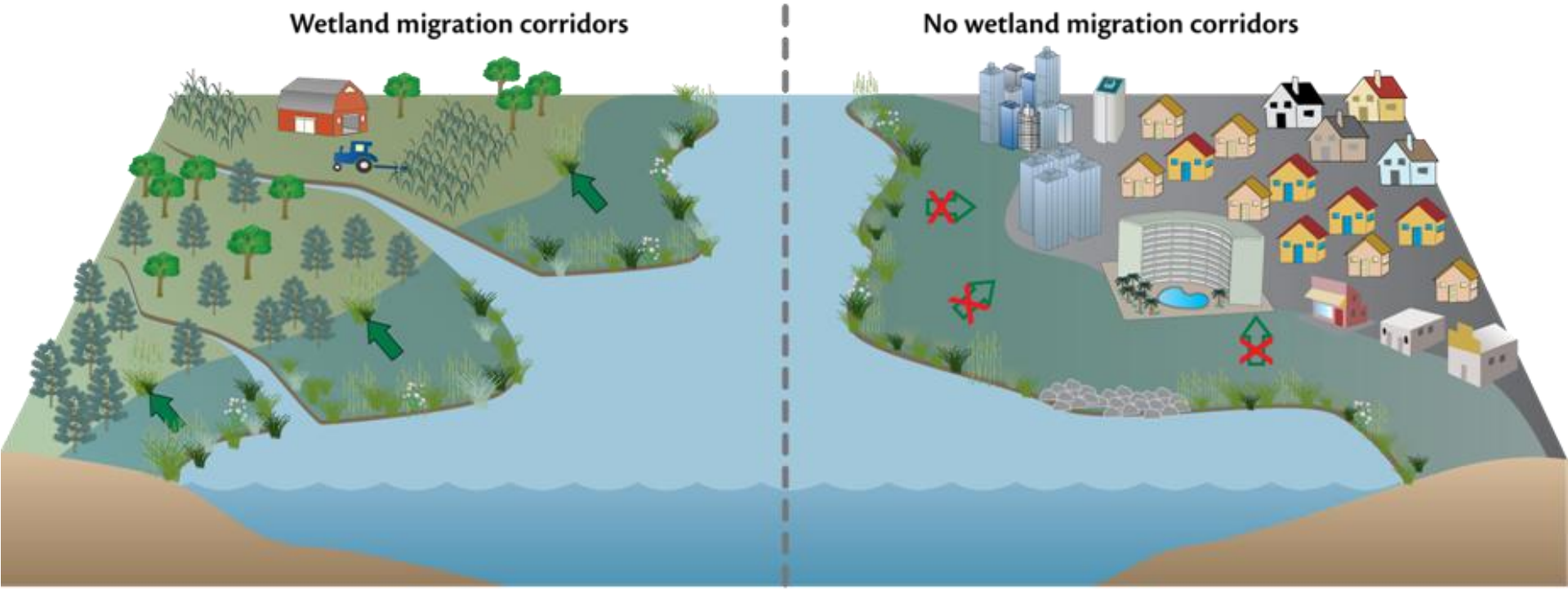
Shift to sustainable economies and investments; and, avoid assumption of the financial risk of development and redevelopment in highly hazardous coastal areas

Enhance preparedness and planning efforts to protect human health, safety and welfare

Protect and restore Maryland's natural shoreline and its resources, including its tidal wetlands and marshes, vegetated buffers, and Bay Islands, that inherently shield Maryland's shoreline and interior

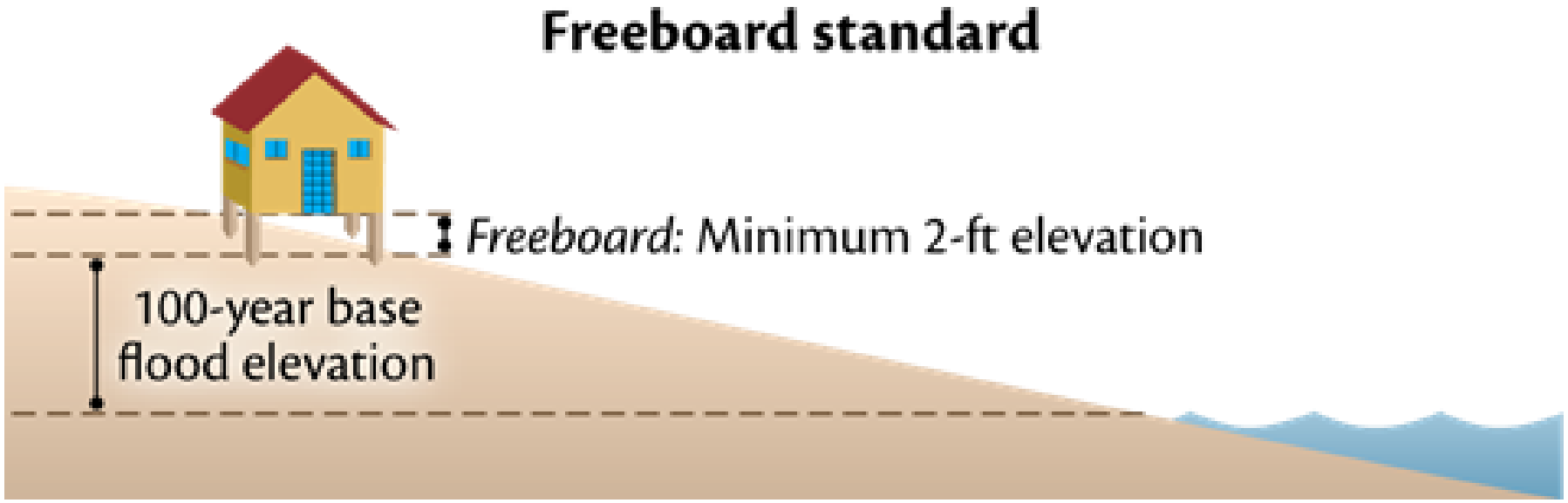
Retain and expand forests, wetlands, and beaches to protect us from coastal flooding

Habitat Migration Corridor



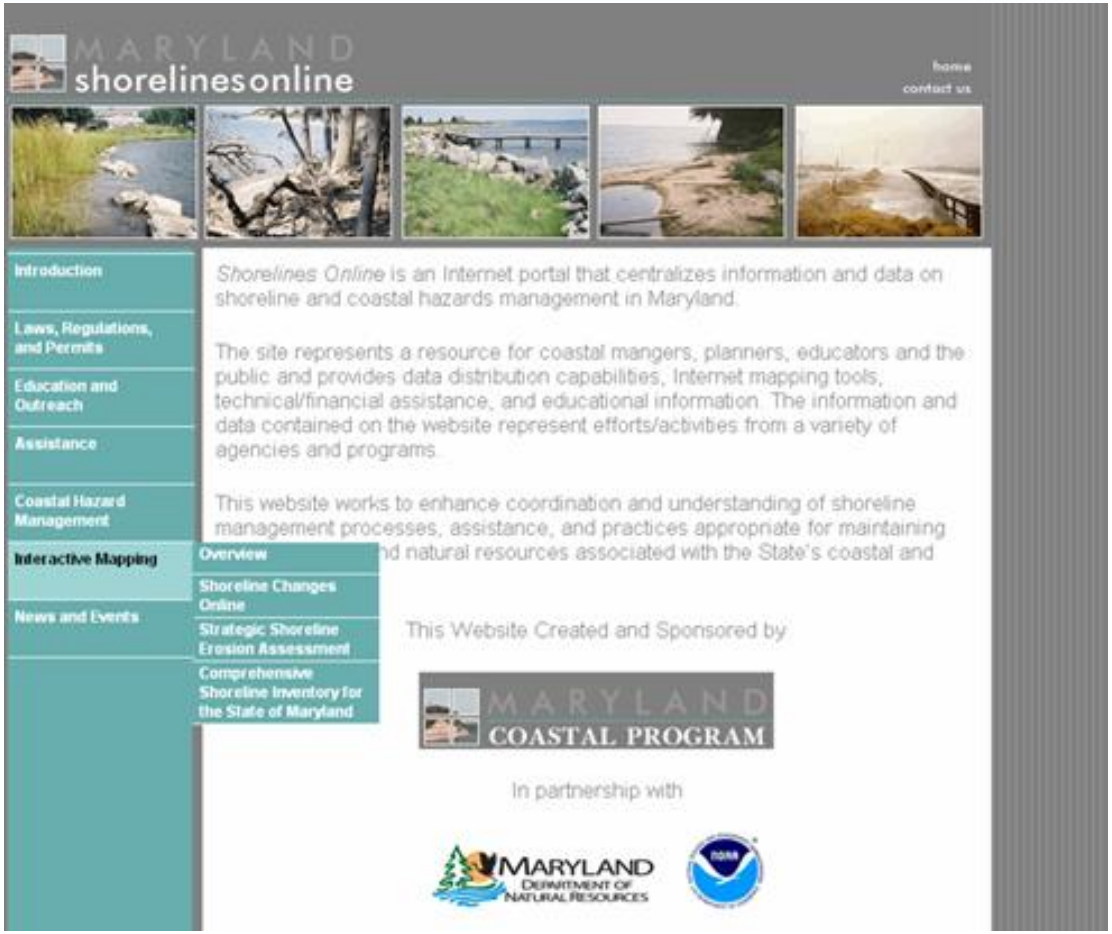
Adaptation Strategy: Facilitate landward movement of high priority coastal ecosystems subject to dislocation by sea level rise

Develop protect, retreat, and abandonment policies for vulnerable coastal infrastructure



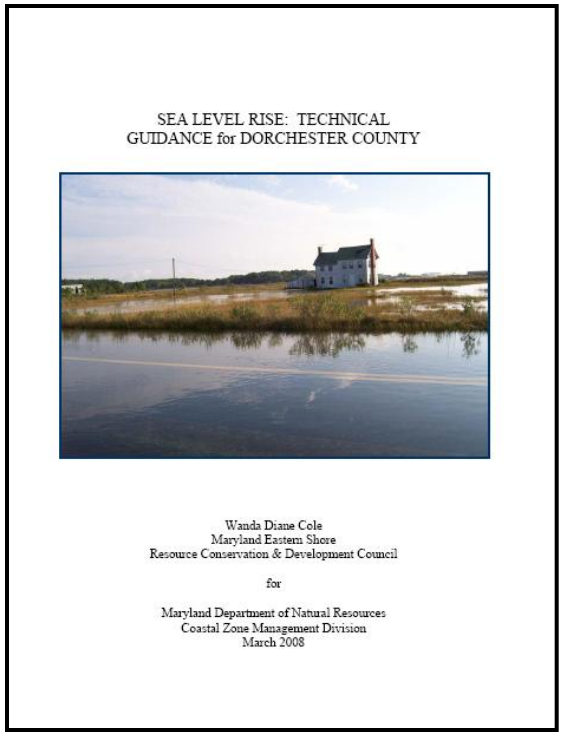
Adaptation Strategy: Elevate new and/or replacement structures 2+ feet above the current 100-year base flood elevation

Give State and local governments the right tools to plan and adapt



Adaptation Strategy: Update and maintain state-wide sea level rise mapping, modeling and monitoring products

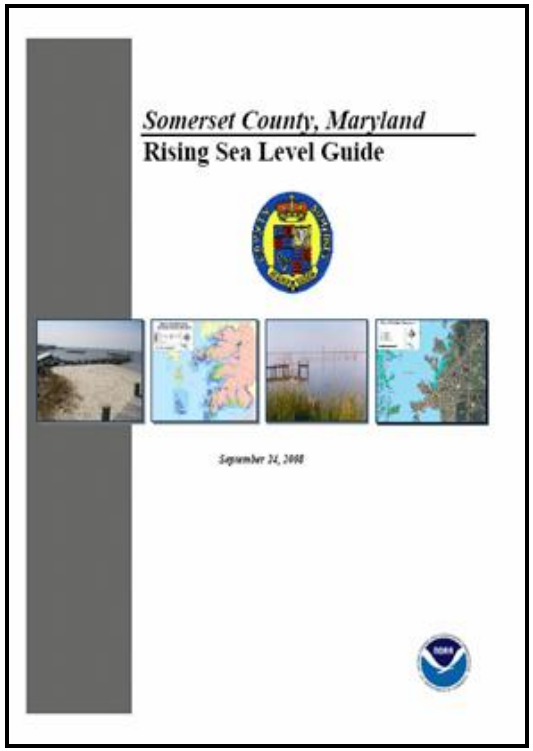
State and local governments must commit resources and time to assure progress


SEA LEVEL RISE: TECHNICAL
GUIDANCE for DORCHESTER COUNTY

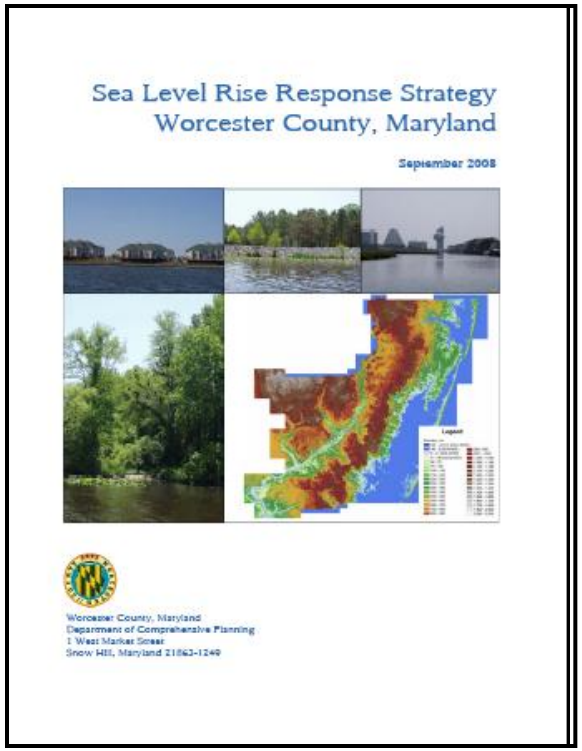
Wanda Diane Cole
Maryland Eastern Shore
Resource Conservation & Development Council

for

Maryland Department of Natural Resources
Coastal Zone Management Division
March 2008


Somerset County, Maryland
Rising Sea Level Guide

September 24, 2008


Sea Level Rise Response Strategy
Worcester County, Maryland

September 2008

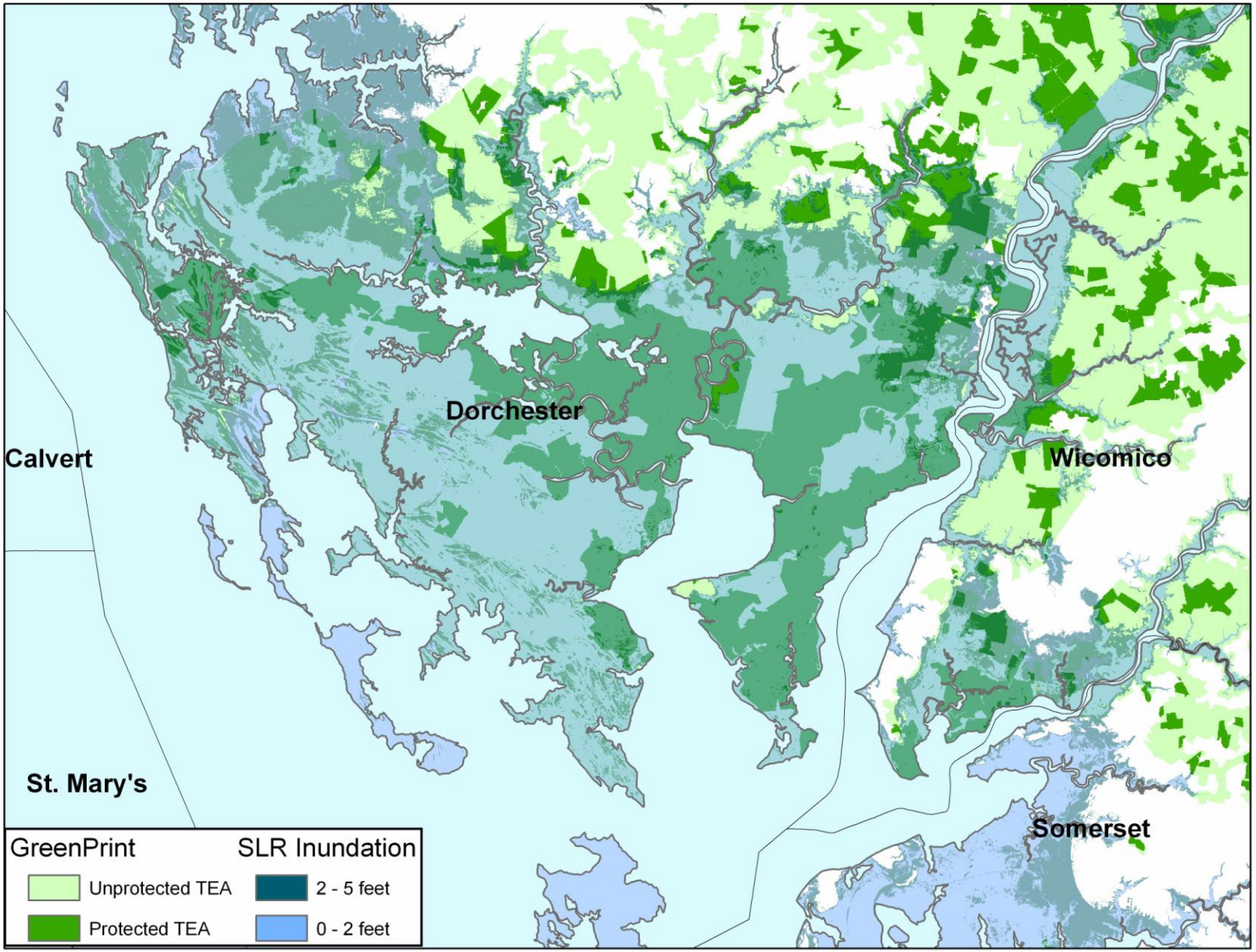
Worcester County, Maryland
Department of Comprehensive Planning
1 West Market Street
Snow Hill, Maryland 21863-1249

Adaptation Strategy: Develop technical planning guidance to advise adaptation planning at local level.

Adaptation Policy Development: Recent Actions

- Living Shoreline Protection Act (2008)
  - Requires non-structural shore protection practices unless proven infeasible
- Chesapeake & Coastal Bays Critical Area Amendments (2008)
  - Increased vegetative buffers
  - Updated jurisdictional boundaries to account for sea level rise
  - Allows for consideration of coastal impacts during growth allocation decisions

Next Step: Adapting to Climate Change through Coastal Land Conservation



Adaptation 2010

- DNR "Lead by Example" Investment Policy
  - Coastal Land Conservation Evaluation Criteria: Targeting Tools for Climate Change Adaptation
  - Siting & Design Criteria for DNR Infrastructure
- Adaptation Toolbox: *The Coastal Atlas* (Lead: DNR)
- Local Government Technical & Financial Assistance: *Building Coast-Smart Communities*: (Lead: DNR)
- SHA Transportation Vulnerability Assessment (Lead: MDOT)
- Historical, Archaeological, and Cultural Resources Vulnerability Study (Lead: MDP)
- Climate Change Insurance Advisory Committee (Lead: MIA)
- Maryland Commission on Climate Change: Phase II Adaptation Strategy Development – "*Beyond Our Coasts*" (Leads: UM & DNR)

Thank You!

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http://www.dnr.state.md.us/dnrnews/infocus/climatechange.asp

MARYLAND DEPARTMENT OF NATURAL RESOURCES

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